

## STICK LUBRICANT AND APPLICATOR

INVENTOR: Michael J. Mitrovich  
6016 NE Bothall Way  
PMB 233  
Kenmore, Washington 98028

### PRIORITY

[0001] This application claims the priority date of the provisional application entitled STICK LUBRICANT AND APPLICATOR filed on May 30, 2003, with serial number 60/474,472, the disclosure of which is incorporated herein.

### DESCRIPTION

#### BACKGROUND OF THE INVENTION

[0002] Field of the Invention. The present invention relates to stick lubricants and stick lubricant applicators and more particularly to applicators utilizing constant force springs and the stick lubricants used.

[0003] Background Information. For many years, there has been a desire to utilize lubricant applicators in numerous applications, particularly involving heavy machinery and/or locomotives. In particular, for over fifty years railroads and transit systems have tried to reduce the destructive wear to wheel flanges that occurs on various cars and parts of the system. Wear is caused when a wheel flange contacts the gauge face of the track when the car is passing through a curve and

when the car moves sideways while in a straight or tangent track. Heavier loads also add increased load stress and wheel flange wear.

[0004] In the prior art, the use of grease or oil applied directly to the flange of a wheel, often with a spray, has been unsatisfactory because of major maintenance problems and difficulty in controlling where the grease or oil is applied. To overcome these difficulties, solid stick lubricant applicators with constant force or coiled spring pressure have been used. Such solid stick lubricant applicators using a solid stick of lubricant pressed against the wheel flange through use of contact with said constant force or coiled spring. In one such configuration, the spring physically contacts the lubricant stick.

[0005] One of the problems inherent in the utilization of such an applicator is in vibration of the spring against the stick lubricant as the rail car is in transit. This vibration and rubbing of the spring against the stick lubricant increases the chances that the spring itself will fail. A second problem inherent in the utilization of such an applicator is in obtaining even pressure across the face of the applying end of the stick lubricant against the wheel flange. The more even the pressure, the more even the application of lubricant. Embodiments of the present invention solve these problems.

## SUMMARY OF THE INVENTION

**[0006]** The present invention is an improved lubricant stick, lubricant stick and spring, lubricator system, etc., depending upon the embodiment.

**[0007]** In one embodiment disclosed, a lubricant stick and coiled constant force spring combination for lubricating a surface are present. The combination configured for utilization with a lubricant applicator, preferably a lubricant applicator for applying a lubricant to a rail wheel flange. The invented combination comprising a lubricant stick and coiled constant force spring.

**[0008]** The lubricant stick having a stick first end extending to a stick second end. The stick first end for contacting the surface to be lubricated. The stick second end for cooperating with the constant force spring. This spring configured for holding the first end of the stick against the surface to be lubricated. The stick second end has a channel for receiving the coiled second end of the spring therein. As such, as the lubricant is expended, the spring coils within the channel applies continuous pressure on the stick to the surface to be lubricated.

**[0009]** The coiled constant force spring has a spring first end extending to a spring second end. The first end preferably comprising an attachment for attaching to a lubricant applicator slide. Through said connection, the spring can be unrolled away there from. The portion of the

spring, which extends from the spring first end to and including the spring second end, is by default coiled. The spring second end being configured for receipt into the channel.

**[0010]** When used in the preferred applicator, the lubricant stick is inserted into the applicator and then the spring is attached to the lubricant applicator slide. The slide and the applicator are then slid together. In the process of sliding the slide and the applicator together, the coiled portion of the spring unrolls within the channel, applying a constant force in holding the stick lubricant against the surface to be lubricated.

**[0011]** The purpose of the foregoing Abstract is to enable the United States Patent and Trademark Office and the public generally, and especially the scientists, engineers, and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection, the nature and essence of the technical disclosure of the application. The Abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

[0012] Still other objects and advantages of the present invention will become readily apparent to those skilled in this art from the following detailed description wherein I have shown and described only the preferred embodiment of the invention, simply by way of illustration of the best mode contemplated by carrying out my invention. As will be realized, the invention is capable of modification in various obvious respects, all without departing from the invention. Accordingly, the drawings and description of the preferred embodiment are to be regarded as illustrative in nature, and not as restrictive in nature.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Figure 1 is an environmental perspective view of a lubricant applicator configured to utilize the present invention showing how the applicator is positioned, in proximity to the wheel flange of a locomotive.

[0014] Figure 2 is an exploded perspective view of the lubricant applicator of Fig. 1, showing how the wheel flange lubricant applicator is attached to the locomotive.

[0015] Figure 3 is an exploded perspective view of the lubricant applicator of Fig. 1, showing the various parts on the inside of the combination holder and dispenser.

[0016] Figure 4 is a longitudinal cross section view, taken along line 4-4 of Figure 2, also

showing the inside of the combination holder and dispenser of the lubricant applicator of Fig. 1 invention and showing how the applicator is attached to a pre-existing mounting bracket on a rail car.

[0017] Figure 5 is a perspective view of the lubricant applicator of Fig. 1 when the applicator is attached to a rail car using a pre-existing mounting bracket that also mounts a sand tube to the rail car.

[0018] Figure 6 is a perspective view of the applicator of Fig. 1 showing how the applicator is attached to a pre-existing mounting bracket on a locomotive. In the embodiment shown in Figure 6, the pre-existing mounting bracket was previously used to mount a spray type lubricant applicator to the locomotive.

[0019] Figure 7 is a perspective view of the lubricant applicator of Fig. 1 showing how the applicator is attached to a railroad truck by a mounting bracket so that the applicator disposes lubricant onto a wheel flange.

[0020] Figure 8 is a schematic view of an example of a lubricant applicator being used to lubricate heavy-duty chain.

[0021] Figure 9 is a partial, perspective view of a first embodiment of a lubricant stick of the present invention.

[0022] Figure 10 is a partial, perspective view of a second embodiment of a lubricant stick of the present invention.

[0023] Figure 11 is a partial, perspective view of a third embodiment of a lubricant stick of the present invention.

[0024] Figure 12 is a partial, perspective view of a fourth embodiment of a lubricant stick of the present invention.

[0025] Figure 13 is a partial, perspective view of a fifth embodiment of a lubricant stick of the present invention.

[0026] Figure 14 is a partial, perspective view of a sixth embodiment of a lubricant stick of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS:

[0027] While the invention is susceptible of various modifications and alternative constructions, certain illustrated embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific form disclosed, but, on the contrary, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention as defined in the claims.

[0028] The present invention is an improved lubricant stick configuration and method of utilizing said lubricant stick. A discussion of the utilization of this lubricant stick configuration can best be had through discussion of its use with the preferred type of lubricant applicator. While this disclosure refers specifically to this particular embodiment of lubricant applicator, such reference is not intended to be a limitation of the configuration, the stick itself nor, the manner of applying said lubricant stick to a surface to be lubricated. Nor is this specific disclosure (the lubrication of rail wheel flanges on rail cars and/or locomotives) intended to be a limitation on the intended application or use of the present invention, in that the present invention can be utilized to apply a lubricant or other substance to other types of surfaces, including but not limited to the application of a lubricant to crane wheels and logging drag chains.

[0029] Referring initially to Figure 1, shown is an environmental perspective view of a typical lubricant applicator showing how the device is positioned in proximity to the wheel flange of a locomotive. The lubricant applicator 10 is positioned in proximity to the wheel flange 12 of the locomotive 14, as seen most clearly in Figure 2 and as will be described in greater detail hereinafter.

[0030] Referring now to Figure 2, shown is an exploded perspective view of the lubricant applicator 10, showing the example of the lubricant applicator being attached to a locomotive 12. It is also within the spirit and scope of the invention to mount the lubricant applicator, as shown in any of the hereinafter described examples, to a boxcar or other rail car (not shown).

[0031] The shown lubricant applicator 10 in general, comprises a combination holder and dispenser 16, having a lubricant, generally in the form of a stick 18, positioned in the inside 20 of the combination holder and dispenser 16. The combination holder and dispenser 16 is generally a three-sided rectangle, having a top 22, a bottom 24, and a first closed side 26. The second side 28 of the combination holder and dispenser 16 forms an open side 30 of the rectangle. The rectangle also has a first front open end 32 and a second rear open end 34.

[0032] Figure 2 shows an embodiment wherein the lubricant applicator 10 is attached in proximity to wheel flanges 12 in a location that also carries a sand tube 36, as shown and

described in greater detail in reference to Figure 5. Figure 2 shows a portion of the truck 38 of the locomotive 14 and a suspension spring 40 for the locomotive 14, as seen in Figure 1.

[0033] Referring now to Figure 3 of the drawings, there is shown an exploded perspective view of the lubricant applicator 10 showing the various parts on the inside 20 of the combination holder and dispenser 16. In the applicator shown, the lubricant is disposed from the same portion of the combination holder and dispenser 16 as the lubricant stick 18 was inserted, in the rear portion 41 of the combination holder and dispenser 16, by any form of dispensing system 42. The dispensing system 42 pushes lubricant from the rear portion 41 of the combination holder and dispenser 16 out the front portion 43 of the combination holder and dispenser 16 onto a position 44 where lubricant will be disposed. In the example shown in Figure 2, that position 44 would be on a wheel flange 12.

[0034] The lubricant applicator 10 uses a constant force system 45 as a dispensing system, as will be described hereinafter with reference to Figure 4. The constant force system 45 as described is only an example of one type of dispensing system 42, and it is within the spirit and scope of the present invention to be utilized by any other dispensing system 42. A spring holder and slide mechanism 46 slides into a slotted channel 47 in the open side 30 on the second open side 28 of the combination holder and dispenser 16, the spring holder and slide mechanism 46 thereby forming a fourth side 48, replacing the open side 30, of the combination holder and

dispenser 16, as seen most clearly in Figure 4.

**[0035]** The spring holder and slide mechanism 46 and the constant force spring 49 sit in the channel 47 on the second open side 30 of the combination holder and dispenser 16. Thus, when the constant force spring 49 is unrolled, it sits in the channel 47 and does not come in contact with the sides 50 and 52 of the lubricant stick 18, as seen in Figure 4. This prevents the lubricant stick 18 from rubbing against the side 54 of the constant force spring 49, also as seen most clearly in Figure 4, thereby avoiding the premature breaking of the spring 49.

**[0036]** Referring now to Figure 4 of the drawings there is shown a longitudinal cross sectional view, taken along line 4-4 of Figure 2, also showing the inside of the combination holder and dispenser 16. In Figure 4 it can be seen that in general, a dispensing system 42 in the form of a constant force system 45 is comprised of a positioning member 56 in the form of the spring holder and slide mechanism 46 that holds a constant force actuator 57 in the form of the constant force spring 49. A locking member 58 in the form of a pin 59 holds the spring holder and slide mechanism 46 and constant force spring 49 at a constant force against the lubricant stick 18 within the combination holder and dispenser 16. In this way, the combination holder and dispenser 16 applies new lubricant pushed forward from the rear portion 41 of the combination holder and dispenser 16 and out of the front portion 43 of the combination holder and dispenser 16.

[0037] The spring holder and slide mechanism 46 has a forward end 60 positioned at the front portion 43 of the combination holder and dispenser 16 and a back end 62 positioned at the rear portion 41 of the combination holder and dispenser 16. A slot 64 at the forward end 60 of the spring holder and slide mechanism 46 allows the constant force spring 49 to be attached to the front portion 43 of the spring holder and slide mechanism 46. The constant force spring 49 has a flat end 66 and a coiled end 68. At the flat end 66 of the constant force spring 49 there is a tab 70, the tab 70 being inserted into the slot 64 on the forward end 43 of the spring holder and slide mechanism 46 to thereby attach the constant force spring 49 to the spring holder and slide mechanism 46 before the spring holder and slide mechanism 46 is inserted into the combination holder and dispenser 16.

[0038] Referring to Figure 4, the lubricant stick 18 has a forward portion 72 and a rearward portion 74. The forward portion 72 of the lubricant stick 18 is configured; to be pushed into the rear portion 64 of the combination holder and dispenser 16, then the spring holder and slide mechanism 46 is inserted behind the combination holder and dispenser 16. The combination holder and dispenser 16, is never moved from its location and is never removed from its position in proximity to a position 44 where lubricant will be disposed. In the example shown in Figure 2, the position 44 is on a wheel flange 12.

[0039] Referring back to Figure 4, the coiled end 68 of the constant force spring 48 as installed in the spring holder and slide mechanism 46 pushes against the rearward portion 74 of the lubricant stick 18, preferably at a constant force. It is preferred that the coiled end 68 be received within a spring channel 73. The lubricant stick 18 thereby presses against a position 44, for example a wheel flange 12 at a constant force in a consistent manner, and applies lubricant to a position 44 or a wheel flange 12, as seen most clearly in Figure 2.

[0040] The various shapes of spring channels 73 can be seen in the Figures, specifically Figure 9-14. The rearward portion 74 of the lubricant stick 18 defining a first face 75 opposite a second face 77. Figures 3, 4 and 9 shows the definition of a generally rectangular shaped spring channel 73, extending through both the first face 75 and the second face 77. Figure 10 shows the definition of a generally semi-cylindrical shaped spring channel 73. Figures 11 and 12 show the definition of generally prismatic shaped spring channels 73. Figure 13 shows the definition of a trapezoidal prismatic/semi-hexagonal shaped spring channel 73. Figure 14 showing a spring channel 73 shaped similar to the shape shown in Figure 13. Other embodiments are also envisioned as part of the disclosure of this application, including but not limited to arcing or rounding the corners shown in the aforementioned figures. The variety shown in these embodiments clarifying the fact that many different types and styles of channels formed or defined within the rearward portion 74 of the lubricant stick 18 of the present invention are considered within the present invention. These examples intended as illustrative, but not

exclusive.

[0041] The purpose of the spring channel 73 of the present invention is to provide a channel within the rearward portion 74 of the lubricant stick 18 for receiving therein the coiled end of the spring 68. By receiving the coiled end therein, movement of the spring perpendicular to the length of the spring is limited, thereby reducing side-to-side movement of the spring in use and the resulting wear upon the spring. The utilization of such a spring channel thus reduces spring wear and breakage. A second benefit of utilizing a channel is in centering the alignment of the spring. By centering the alignment of the spring, the spring applies a constant and regular amount of pressure to the lubricant stick. This increases the uniformity of application of lubricant upon the surface being lubricated.

[0042] Preferably, in the first closed side 26 of the combination holder and dispenser 16, in proximity to the front portion 43 of the combination holder and dispenser 16 there is a window 76 in the side 26 of the combination holder and dispenser 16 that allows a maintenance person to see how much of the lubricant stick 18 remains, as seen in Figure 3. At the front portion 43 of the combination holder and dispenser 16, the opening 78 is preferably angled so that the combination holder and dispenser 16 can come close to the position 44 or wheel flange 12 without touching it, as seen most clearly in Figures 2 and 3.

[0043] Preferably, positioned at the second open side 30 of the combination holder and dispenser 16 is an attaching member 80 in the form of a rectangular tube 82 adapted to receive an intermediate variable attaching member 84 for attaching the combination holder and dispenser 16 in proximity to the position 44 or wheel flanges 12, as seen most clearly in Figures 2 and 3. With minor modifications the intermediate variable attaching member 84 of such a lubricant applicator can be altered to accommodate a variety of pre-existing mounting members.

[0044] As seen in Figure 3, the attaching member 80 has a first portion 85 and a second portion 86, whereby the first portion 85 slides into the second portion 86. The first portion 85 of the attaching member 80 has a hole 87 and the second portion 86 has a slot 88. A nut and bolt combination 89 is positioned through the hole 87 in the first portion 85 of the attaching member 80 and through to the slot 88 in the second portion 86 to secure and position the attaching member 80 at a desired variable distance relative to the lubricant applicator 10 and its attachment to a locomotive 14. The hole 87 in the first portion 85 of the attaching member 80 is not directly visible in the drawings but is behind the bolt and nut combination 89. Other manners and mechanisms of attachment of the present invention to the railway car/locomotive/machinery are also envisioned.

[0045] In operation then, when it is desirable to change the lubricant stick 18 on such a wheel flange lubricant applicator 10, the pin 59 is removed, the u-shaped handle 91 of the spring holder

and slide mechanism 46 is pulled backward from the second rear end 62 of the combination holder and dispenser 16, as seen most clearly in Figure 4. As the spring holder and slide mechanism 46 is pulled backwards from the rear portion 41 of the combination holder and dispenser 16, the flat end 66 of the coil spring 49 is rolled back up into a coiled position and pulled backward also. The spring holder and slide mechanism 46 is then removed from the combination holder and dispenser 16, a new lubricant stick 18 is pushed into the combination holder and dispenser 16, and the spring holder and slide mechanism 46 is then reinserted into the rear portion 41 of the combination holder and dispenser 16 behind the lubricant stick 18; the pin 59 is positioned through two holes 90 and 92 in the rear portion 41 of the combination holder and dispenser 16, thus securing the spring holder and slide mechanism 46, as seen most clearly in Figure 3.

**[0046]** Such a lubricant applicator 10 thereby allows for the fast and easy replacement of a lubricant stick 18 through the second rear portion 41 of the combination holder and dispenser 16. Thus, the combination holder and dispenser 16 does not need to be moved or removed from its position on the locomotive or rail car in order to change the lubricant stick 18.

**[0047]** While it is somewhat unlikely to occur, if the uncoiled constant force spring 49 tends to coil back up, it is possible that the spring holder and slide mechanism 46 could accidentally eject out of the second rear portion 41 of the combination holder and dispenser 16. In order to

avoid this, a metal ring 94 is attached to the top 96 of the pin 59. A wire 98 having two ends 100 and 102, has its first end 100 attached to the metal ring 94 and its second end 102 securely attached to the u-shaped handle 91 of the spring holder and slide mechanism 46, holding the spring holder and slide mechanism 46 in place, as seen most clearly in Figure 3. The spring holder and slide mechanism 46 is thereby prevented from accidentally ejecting from the rear portion 41 of the combination holder and dispenser 16.

**[0048]** The lubricant applicator 10 as described above has been adapted to attach to a variety of positions in proximity to a position where lubricant will be disposed. It is within the spirit and scope of the invention to attach it to any number of locations or positions. That which is described hereinafter refers to various ways of mounting the lubricant applicator 10 in proximity to a wheel flange 12, as seen most clearly in Figure 2. It is to be understood that this description should in no way limit the invention, but is used by way of examples only.

**[0049]** Referring now to Figure 5 of the drawings, there is shown a perspective view of another embodiment of a lubricant applicator 10 that is attached in proximity to wheel flanges 12 in a convenient location that also carries mounting hardware 104 for a sand tube 36. Sand tubes 36 take different forms on different types of trains, but in Figure 5, the sand tube 36 is attached to a generally square shaped mounting opening 106 on the locomotive 14. In the embodiment as shown in Figure 5, the intermediate variable attaching member 84 in the form of a mounting

bracket 108, is attached to the generally square shaped mounting opening 106 for the sand tube 36, thereby attaching the combination holder and dispenser 16 generally perpendicular to the sand tube 36 and aiming the first front open end 32 of the combination holder and dispenser 16 to dispense lubricant on a wheel flange 12.

[0050] Referring now to Figure 6 of the drawings, there is shown a perspective view of the lubricant applicator showing how the applicator is attached to a pre-existing mounting bracket on a locomotive. The attaching member 80 attaches the combination holder and dispenser 16 to an intermediate variable attaching member 110. The attaching member 80 in Figure 6 inserts into a mating rectangular receptacle 112, unlike the embodiment shown in Figures 2 and 3 where the attaching member 80 includes a first 85 and a second portion 86.

[0051] It is also within the spirit and scope of the applicator shown in Figure 6 to have the attaching member 80 and the receptacle 112 as an integral one piece unit since it is unnecessary to remove the attaching member 80 from the receptacle 112 or from a pre-existing mounting bracket 114 when the lubricant stick 18 is being replaced through the rear portion 41 of the combination holder and dispenser 16. In the prior art, lubricant applicators that sprayed lubricant onto the wheel flanges 12, were used. These spray-on lubricants were attached to the locomotive 14 with a pre-existing mounting bracket 114, as seen in Figure 6. This pre-existing mounting bracket 114 then can be attached to the intermediate variable attaching member 110 as shown in

Figure 6, such that the combination holder and dispenser 16 is attached to the locomotive 14 in a position where the front portion 43 of the combination holder and dispenser 16 is aimed at a position 44 or wheel flange 12, as seen most clearly in Figures 2 and 5. The intermediate variable attaching member 112 in Figure 6 is therefore different than the intermediate variable attaching member 84 in Figures 2 and 3.

[0052] If it is desired to attach a combination holder and dispenser 16 as seen in Figure 6 and there is no pre-existing mounting bracket 114, a similar mounting bracket can be installed on the locomotive 14, as seen in Figure 1, the new mounting bracket 112 would be adapted to receive the intermediate variable attaching member 110. In Figure 6 it can be seen that the pre-existing mounting bracket 114 has at least one slot 115 adapted to receiving a nut and bolt combination 116 of the intermediate variable attaching member 110.

[0053] Referring now to Figure 7 of the drawings, there is shown a perspective view of the lubricant applicator showing how such an applicator is attached to a railroad truck by a mounting bracket 2, so that the applicator disposes lubricant onto a position 44 or a wheel flange 12. There are many different types of train trucks. Such a lubricant applicator 10 could be attached to any of them and the attachment arrangement as shown in Figure 7 is an example only. In the example shown in Figure 7 the combination holder and dispenser 16 is attached to the truck 38 of a locomotive 14.

**[0054]** As with the other examples, the combination holder and dispenser can be mounted on the truck of a boxcar or other rail car (not shown). In Figure 7 it can be seen that the combination holder and dispenser 16 is attached to the truck 38 of a locomotive 14. The same locking member in the form of a pin that is used in the previously described applications is also used in Figure 7. The mounting bracket is generally a flat, L-shaped configuration, having a slot in the vertical portion of the L-shape that holds the combination holder and dispenser after the combination holder and dispenser is positioned in the slot, the combination holder and dispenser is welded fixedly in place. Within the right angle of the L-shape there is positioned a triangularly shaped brace to reinforce the L-shape and to keep the mounting bracket from bending. The horizontal portion of the L-shape is fixedly attached to the bottom of the truck frame of the locomotive.

**[0055]** Referring now to Figure 8 there is shown a schematic view of an example of such a lubricant applicator 10 being used to lubricate heavy-duty chain 136. The lubricant applicator 10 is shown lubricating chain 136 at a position 138 where the chain 136 would be moving under the lubricant applicator 10 in any kind of heavy machinery application. Also, in Figure 8, in dashed lines, there are shown alternative applications 140, 240, wherein the lubricant applicator is at a position to lubricate the teeth of a sprocket. In Figure 8, the attaching member can be attached to any location to position the lubricant applicator where it should be positioned to properly dispose

lubricant.

[0056] Referring now to Figures 9-14, shown are various embodiments of stick 18 rearward portions 74. While these particular embodiments are shown as preferred, other embodiments, shapes, sizes and configurations of rearward portions are also envisioned. This disclosure of embodiments is not intended as being exclusive.

[0057] Figure 9 shows a rearward portion 74 that is generally U-shaped, defined by a spring channel 73 formed through the second end 71, the top face 75 and the bottom face 77. This channel being generally perpendicular to the planes of the top face and bottom face.

[0058] Figure 10 shows a quarter-cylindrical shaped spring channel 73 defined within the rearward portion 74, extending through the second end 71 and the top face 75.

[0059] Figure 11 shows a triangular prism shaped spring channel 73 defined within the rearward portion 74, extending through the second end 71 and the top face 75.

[0060] Figure 12 shows a triangular prism shaped spring channel 73 defined within the rearward portion 74, extending through the top face 75 and the bottom face 77 at its joint with the second end 71.

[0061] Figure 13 shows a semi-hexagonal shaped spring channel 73 defined within the rearward portion 74, extending through the top face 75 and the bottom face 77, generally perpendicular to the planes of the top and bottom faces. The shape extending to the end second 71 in a point. Alternatively, this point could be rounded.

[0062] Figure 14 shows a semi-hexagonal shaped spring channel 73 defined within the rearward portion 74, extending through the top face 75 and the bottom face 77, generally perpendicular to the planes of the top and bottom faces. The shape extending short of the second end 71, this short end alternatively could be rounded.

[0063] Again, this spring channel 73 for receiving the coiled end 68 of the spring 49 therein. The shape of the spring channel 73 for supporting and generally cradling the spring coiled end therein, thereby reducing spring chatter, which decreases spring wear and breakage. The cradling of the spring therein furthermore provides for a more consistent application of spring force to the lubricant stick thereby resulting in a more even application of lubricant to the surface to be lubricated.

[0064] While there is shown and described the present preferred embodiment of the invention, it is to be distinctly understood that this invention is not limited thereto, but may be

variously embodied to practice within the scope of the following claims. From the foregoing description, it will be apparent that various changes may be made without departing from the spirit and scope of the invention as defined by the following claims.